stringent, is that the camera has to be in a position to view the screen. Where this is difficult, for example when the camera face outward from the screen, a mirror can be used for example. The mirror in this case can have fixed marks just like an object, which allow its orientation to be determined by the camera computer system, and thus any error in its pointing angle adjusted.

[0734] Screen generated targets can also be used to calibrate the field of view of the camera to take out lens errors and the like, and to adjust relationships between two cameras of a stereo pair (or even more sets of cameras).

[0735] For example if two cameras are arbitrarily pointed in the direction of the screen, a spot can be projected on the screen which will register in each camera image. Since the spot position is known in x and y due to projection, and one can measure z with a ruler, the system can calculate the pointing direction of the cameras as a result.

[0736] Orientation Codes

[0737] Inventions by one of the inventors and his colleagues describe a useful machine readable code for use on objects which can give orientation of the object from the point sensed—and provide an identification of the object as well. One could even call up a server over the internet, and down load a data description of object, and relation of that object to software provided.

[0738] It is noted that special targets useful in the invention may be designed of diffractive or holographic based material so as to provide, for example, directional and/or color based responses to light input. This can be used to recognize or identify targets, and for causing desirable light distribution on reflection which aid the detection process by a suitable camera

[0739] **FIG. 27**

[0740] Here discussed are convenient high brightness (and contrast) retroreflective target items such as retro-reflective jewelry and makeup according to the invention, which can greatly aid the use of the invention by persons. For example, a wristwatch can contain high specific reflectivity retroreflective glass bead or corner cube material in its face or hand that can be sensed by the camera or cameras of the invention in order to easily find the wrist and hand in a field of view. Similarly rings on the fingers containing such material can greatly aid the ability of the camera system to see the fingers and to get close enough such that relatively simple image processing can find the fingertips from the ring, or with more difficulty, from the wrist watch. Similarly, belt buckles, bracelets, pins, necktie clips and the like can all serve this purpose in a decorative and aesthetically pleasing manner.

[0741] Even makeup can be produced whose chemical formulation incorporates retro-reflective beads (typically 0.002-0.003 inch in diameter on an individual basis), such as nail polish, lip stick, eye shadow, and the like which all serve some purpose for computer interaction in various software scenarios (especially the fingertips). Specialized makeup for other parts of the body can be created, e.g. for the wrist, toes or what have you.

[0742] Consider ring **2801** having band **2802** and a "jewel" comprised of a corner cube retro-reflector **2803**, capable of very high contrast return signals to near on axis illumination. Or consider that the jewel could be a diamond (real or synthetic) cut to reflect light incident from many angles in somewhat similar manner. Or consider ring **2815** having 5 corner cubes, **2826-2830**, each pointing in different directions, to allow operation from a variety of finger positions.

[0743] Consider too, ring band **2840** comprised of a base ring, **2845** with retro-reflective bead tape material **2850** attached, and covered with a protective plastic overlay **2855**. (thicknesses exaggerated for clarity). The overlay could be either totally transparent, or alternatively of band pass material, that would only allow reflection back of a specific wavelength band,(eg matching an LED illumination wavelength). Or the user might chose to wear multiple rings each of a different color, which could be color identified. Or multiple users, each with a different color, say. Note that A special flat tape type retroreflector can be provided having a microprism grating or grille or a diffraction grating or grille on its face which directionally alters the incoming and outgoing radiation so as to be able to bee seen from more nominal angles than normal material such as Scotchlight 7615 of 3M company.

[0744] Additional Information re **FIG. 1** Embodiment

[0745] The retroreflection illumination light source is substantially coaxial with the optical axis of said tv camera when retro used The LED as the preferred source to illuminate reflective targets;

[0746] If an LED is used, it has the advantage of low power requirement, self-luminous and of a known wavelength. This means that the camera can be filtered for this wavelength quite easily, although, if it is, it won't see other wavelengths very well by definition.

[0747] LED light sources for target illumination are preferable because of the programmability i.e. ease of turning on/off, or modulating on a given frequency or pulse duration and they are low cost and low energy consumption. Operating in the Infrared, they do not bother the user or non-visible wavelengths.

[0748] **FIG. 1***a* has illustrated a simplified version of the invention using even one retro-reflective item such as a ring, a thimble with a target on it, a snap on finger target, a color or retroreflective painted nail or other feature on the person. The camera used for this is either a special camera dedicated to the task or shared with a video-imaging camera.

[0749] In order to operate the invention, the LED light source (which in one embodiment is comprised of a ring of LEDs such as **26** around the camera Lens **24**, pointing outward at the subjects to be viewed) is turned on, and in one case, a bandpass filter (passing the LED wavelength) such as **25** is placed over the lens of the camera that might be normally used simply for acquiring images for Internet telephony or what have you. This filter can be screwed, slid on or snapped on or any other way that allows it to be easily removed when non-filtered viewing is desired.

[0750] To make the measurement, the LED's surrounding, in this case in a ring arrangement, surrounding the lens, that is easily attached to the camera by suitable attachments either permanent or in some cases temporary. This is due to the wide variety of nature of cameras today or quasi-permanent via highly sticky adhesive.